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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,468	09/16/2003	James Charles Bohling	A01447	2194

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ROHM AND HAAS COMPANY
PATENT DEPARTMENT
100 INDEPENDENCE MALL WEST
PHILADELPHIA, PA 19106-2399

EXAMINER

ZEMEL, IRINA SOPHIA

ART UNIT PAPER NUMBER

1711

DATE MAILED: 08/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/663,468

Applicant(s)

BOHLING ET AL.

Examiner

Irina S. Zemel

Art Unit

1711

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-10 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4-7-2004
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 1 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for styrene-based polymer beads, does not reasonably provide enablement for polymer beads based on any other polymers. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The specification reasonably enables for polymeric beads based on polystyrene polymer that can be functionalized and, when functionalized, exhibit claimed protein coupling properties. However, it clearly would require undue experimentation to determine which crosslinked polymeric beads a) can be functionalized in the manner provided in the claim, and b) when and if functionalized exhibit required coupling behavior/properties.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 3,995,094 to Crosby et al., (hereinafter "Crosby").

Crosslinked styrene-divinylbenzene polymers containing small amounts of divinylbenzene are well known in the art and such polymers with various degree of crosslinking are commercially available, from various sources. For example, Crosby discloses styrene (S)-divinylbenzene (DVB) crosslinked polymers with low degree of crosslinking thus full anticipating claims 1 and 2. See, for example, column 2, line 26 to column 2, line 4 where the reference discloses S-DVB copolymers with the amount of DVB of between 0.0.1 and 4 %. Applicants should note that the polymer bead claimed in claim 1 does not have to be functionalized or coupled, and in fact, is NOT functionalized or coupled because of the recitations of the clause "when: (i) functionalized.... (i) coupled...", etc., thus implying that the claimed bead is not functionalized. Claim 1 recitations concerning functionalization and coupling and, further, the coupling characteristics are intended use and future properties limitations. It is well established by the court that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In the instant case, a 1-3 % crosslinked S-DVB polymer disclosed in the reference is identical to the polymers used by applicants in their functionalization process, and as such, is inherently capable for being functionalized and coupled in a recited manner as evidenced from applicants' own disclosure, and as further evidenced from the

disclosure, when functionalized in the recited manner, the polymer will inherently exhibit recited coupling properties. Therefore, the invention as claimed is fully anticipated by the cited reference.

Claim Rejections - 35 USC § 102/103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-5 and 7-9 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Crosby.

Claims 3-5 and 7-9 are product-by-process claims that claim a functionalized polymer. Crosby discloses functionalized polymers that are obtained by reacting S-DVB crosslinked polymers containing 0.1-4 % of DVB via Friedel-Crafts reaction with functionalizing agent. Suitable solvents include nitrobenzene and nitro-alkyls. See column 3, lines 24-37. The functionalized beads disclosed by the reference may have been obtained via different process, i.e., the reference does not disclose degree of swelling of polymer prior to contacting the polymer with functionalizing agent or exact degree of swelling that solvents are capable of as per claims 3 and 7. However, in view of the starting polymers and solvents disclosed by the reference (S-DVB and nitro-alkyls/aryls), it is believed that the degree of polymer swelling would correspond to the claimed degrees and the resulting polymers would inherently exhibit the same properties (such as degree of polymerization) as polymers obtained by the claimed

process. The burden is shifted to applicants to provide evidence commensurate in scope with the claimed invention that polymers obtained by the claimed steps are different from the functionalized polymers disclosed in the reference.

Claims 3-5 and 7-8 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US Patent to 5,330,687 to Rieke et al., (hereinafter "Rieke").

Rieke discloses slightly cross-linked S-DVB polymers that are functionalized with a variety of different functionalization agents. The list of the functionalization agents or electrophiles is disclosed, for example, in column 13, lines 47-62. The reference discloses examples of functionalizing of crosslinked or insoluble S-DVB polymers. See, for example, illustrative examples 2,3, 4 etc. The reference explicitly states that the amount of DVB in preferred insoluble or crosslinked S-DVB copolymers is between 1 and 3 %. See, for example, column 6, lines 7-21. The reference further discusses advantages of swelling crosslinked polymers to different degrees in different solvents prior to the functionalizing the polymer. See column 6, lines 22-47. The reactions of crosslinked polymers with various functionalizing agents in illustrative examples are carried in various solvents, such as THF, which is known to swell S-DVB polymers as per discussion in column 6, lines 22-47. The functionalized beads disclosed by the reference may have been obtained via different process, i.e., the reference does not disclose degree of swelling of polymer prior to contacting the polymer with functionalizing agent or exact degree of swelling that solvents are capable of as per claims 3 and 7. However, because the reference discloses slightly crosslinked S-DVB

copolymers as starting materials and uses solvents capable of swelling those polymers in functionalization reaction, it is reasonably believed that the resulting polymers would be the same as polymers obtained by the claimed process. The burden is shifted to applicants to provide factual evidence that functionalized polymers obtained by the process disclosed in the reference are different from the functionalized polymers obtained by the claimed steps.

Alternatively, it would have been obvious to use polymers with different degree of swelling and in different solvents to obtain various degree of functionalization as per explicit discussion in column 6, lines 22-47.

Claim Rejections - 35 USC § 103

Claims 3-10 are rejected under 35 U.S.C. under 35 U.S.C. 103(a) as obvious over US Patent 5,681,928 to Rivier et al., (hereinafter "Rivier") in combination with Crosby or Rieke.

Rivier discloses functionalized crosslinked S-DVB polymers that are functionalized via Friedel-Crafts reaction. The polymers are loaded with aminoacids in the amounts corresponding to the amount claimed in claims 6 and 10. See illustrative example 7. The amount of DVB in S-DVB copolymer disclosed in the example is 2%. However, varying the amount of DVB and, thus degree of crosslinking would have been obvious to achieve different properties of the crosslinked polymer as per disclosure of Rieke, column 6, lines 7-21. The reference does not specifically address the solvents used in the functionalization reaction, however, as per discussion in Crosby in column 3,

lines 24-37, nitro-alkyls/aryls are common solvents for such reactions and, even if a different solvent is used in reaction disclosed in example 7 of Riever, those solvents would have been an obvious choice of the skilled artisan with reasonable expectation of success. The reference does not address the process steps of the functionalization reaction. However, it is reasonably believed that because the reference discloses slightly crosslinked S-DVB copolymers as starting materials and uses solvents capable of swelling those polymers in functionalization reaction, the resulting polymers would be the same as polymers obtained by the claimed process. The burden is shifted to applicants to provide factual evidence that functionalized polymers disclosed in the reference are different from the functionalized polymers obtained by the claimed steps.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irina S. Zemel whose telephone number is (571)272-0577. The examiner can normally be reached on Monday-Friday 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571)272-1078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ISZ



James J. Seidleck
Supervisory Patent Examiner
Technology Center 1700